
From: SEEDS Joshua
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Sent: 5/8/2013 7:57:38 PM
Subject: FW: Watershed Research Conference and Stream Temperature

Gene,

Julia and I attend the Watershed Research Cooperative's conference on Thursday, April 18th. Researchers presented results for the 3 ongoing paired watershed studies examining the effects of contemporary forest practices in Oregon; some of those results we have seen before. (The 3 paired watershed studies are Hinkle Creek, the Trask River, and Alsea Watershed Revisited.) All harvests were done according to current FPA rules. All studies use a Before/After-Control/Impact design, although only the Trask River study uses any real replication. Most of the research was presented in fairly objective fashion, although there were a few eyebrow raising conclusions or implications about which I think I ought to tell you all.

Beneficial Use Evaluation:

Firstly, the studies are examining beneficial uses directly in addition looking at water quality parameters.

Macroinvertebrate communities have shifted to more sediment-tolerant genera in the Hinkle Creek treatment watershed. The primary fish studied (and really the only fish studied considering the short-term post-harvest period) is cutthroat trout, a disturbance-tolerant salmonid. Growth rates were increased for the older fish, and no population increases or decreases were observed. *The results thus far support the notion that no **short-term** adverse effects were seen for cutthroat trout.* There is no inference for long-term salmonid population effects, and starting (and ending) stream temperatures were well below the biological criteria.

Temperature at Hinkle Creek:

Four non-fish bearing tributaries of South Fork Hinkle Creek were harvested, followed by harvest along SF Hinkle itself 4 years later. The tributaries were ~55% to ~85% shaded by slash (like a tent, not in the water) and flows increased substantially as is typical after a clearcut harvest. As a result, two tribs showed no change in temperature, one went up by 1°C, and one went down by 1°C (the one with the most shade, of course). SF Hinkle Creek itself showed no response to harvest.

Claim Made: Anyone looking for cumulative effects wouldn't have found it here!

Fact Check: There were no overall effects to accumulate. Because the tributaries were shaded so heavily by slash, incident solar radiation was low on the non-fish tribs despite have no vegetation buffer (1+-1+0+0=0; not exactly a real heat budget, but you get the idea). In addition, these are all gaining reaches that consistently add flow from groundwater as the streams go downhill. *Rather than proving the there are not cumulative effects from multiple upstream harvests (the implication), this study successfully demonstrated that retaining some kind of shade on non-fish tributaries protects downstream fish-bearing reaches from temperature impacts.*

Temperature at Needle Branch (Alsea Watershed Study Revisited):

In the end, two harvests will have been done along Needle Branch. The upstream section was harvested a few years ago; the downstream section will be harvested soon. Pre-harvest analysis seems to have verified that Needle Branch's temperature regime has recovered from the rough treatment during the original study in the 1960's. Seven-day average of daily maximum temperature at the bottom of the harvested reach rose by a statistically significant 0.7°C (the same as the average 7dAM temperature increase in harvested private forest reaches in ODF's RipStream study). The 7dAM temperature increased by 0.3°C at the bottom of the downstream unharvested section of Needle Branch (not significant at $\alpha=0.05$, significant at $\alpha=0.10$).

Claim Made: No exceedances of biological criteria, so no problem!

Fact Check: Stream temperatures are below 16°C (near 14°C typically), so substantial heating would be necessary to exceed the biological criterion. This does, however, show a violation of the Protecting Cold Water Criterion at the end of the harvested reach and possibly farther downstream as well. *Full recovery of pre-harvest temperature is **not** seen after passing through a forested section, despite increased flows post-harvest.*

Flow/Sediment at Hinkle Creek:

Flow substantially increased in the harvested tributaries and Hinkle Creek itself. Sediment export from the watershed

increased as well. It is unknown whether this is due solely to more stream bed and bank erosion from increased flows, or whether there was additional sediment supplied from the harvest units, roads, and/or riparian disturbance. There was a substantial dam-break flood in one of the tribs which surely had an impact. More analysis is forthcoming. *More suspended sediment moved through the system, although we don't know why.*

Sediment at Trask River:

The first sediment results are available from the Trask River study, evaluating the effects of road construction and refurbishment. There is a slight but statistically significant increase in turbidity below roads' stream crossings. It is quite small, but it is there. It may just be loose stuff right after road work (this would be typical). I'm not sure if this shows anything new or significant (road work=short-term sediment generation), but it needs watching as it develops, especially given that we are giving current FPA rules the benefit of the doubt for new roads.

Let me know if you have any questions or want to discuss.

Thanks,
Josh

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